CLAIMS

1. A process for producing a siliceous layer capable of biomass immobilization and selectively cutting off macromolecules having a molecular weight higher than a selected threshold, comprising the steps of:

a) supplying a gas flow of a gas carrier saturated by a mixture of silicon alkoxides selected from the group comprising (1)$Si(OR)_4$, (2)$SiH(OR)_3$, (3)$R'Si(OR)_3$ and (4)$R'SiH(OR)_2$ wherein R and R', equal or different each other, are alkyl and/or aryl groups, wherein said gas flow is prepared by bubbling the gas carrier into a liquid mixture of said alkoxides in the ratio of (1)40-85/(2)0-60/(3)0-60/(4)0-60 (% v/v), at a temperature of from 20 to 180°C, preferably of from 20 to 100°C, and

b) exposing a support comprising a biomass to the gas flow of step a),

wherein said selected threshold of molecular weight is chosen in the range of between 10,000 Dalton and 150,000 Dalton and wherein the ratio between the (1), (2), (3) and (4) Si derivatives in step a) is chosen as a function of the molecular weight of the macromolecules to be cut off.

2. A process according to claim 1, wherein R is ethyl or methyl and R' is methyl.

3. A process according to claim 1 or claim 2, wherein the ratio between the (1), (2), (3) and (4) Si derivatives in step a) is chosen in order to cut off macromolecules having a molecular weight higher than 10,000 Dalton.
4. A process according to claim 1 or claim 2, wherein the ratio between the (1), (2), (3) and (4) Si derivatives in step a) is chosen in order to cut off macromolecules having a molecular weight higher than 70,000 Dalton.
5. A process according to claim 1 or claim 2, wherein the ratio between the (1), (2), (3) and (4) Si derivatives in step a) is chosen in order to cut off macromolecules having a molecular weight higher than 90,000 Dalton.
6. A process according to claim 1 or claim 2, wherein the ratio between the (1), (2), (3) and (4) Si derivatives in step a) is chosen in order to cut off macromolecules having a molecular weight higher than 150,000 Dalton.
7. A process according to any one of claims 1, 2 and 6, wherein the content of $R'Si(OR)_3$ derivative in step a) is up to about 10% v/v and it is added in replacement of a same amount of $Si(OR)_4$.
8. A process according to claim 7, wherein the Si derivatives in step a) are $Si(OR)_4/R'SiH(OR)_2/R'Si(OR)_3$ in a ratio of 65-79% / 20-25% / 1-10% v/v.
9. A process according to any one of claims 1 to 6, wherein the content of $R'Si(OR)_3$ derivative in step a)

is between about 10% v/v and about 20% v/v and it is added in replacement of a same amount of $Si(OR)_4$.

10. A process according to claim 9, wherein the Si derivatives in step a) are $Si(OR)_4/R'SiH(OR)_2/R'Si(OR)_3$ in a ratio of 53-70% / 15-25% / 10-22% v/v.

11. A process according to any one of claims 1, 2 and 5, wherein the content of $R'Si(OR)_3$ derivative is 0%.

12. A process according to any one of claims 1 to 11, wherein the total gas flow of step a) is of from 0.05 to 10 L/min for exposing times corresponding to from 1 to 100 mL of total gas per square centimeter of exposed surface.

13. A process according to any one of claims 1 to 12, wherein the support of step b) is a matrix which adheres to a scaffolding material.

14. A process according to any one of claims 1 to 13, wherein the support of step b) is a matrix in form of microsphere having preferably a diameter of from 0.05 to 1.0 mm.

15. A process according to claim 14, wherein the matrix in form of microsphere is without a scaffolding material.

16. A process according to any one of claims 1 to 12, wherein the support of step b) is a scaffolding material without a matrix and the biomass is directly supported on said scaffolding material.

17. A process according to any one of claims 1 to 16, wherein the siliceous layer has a thickness of from 0.01 to 10 µm, preferably from 0.05 to 0.3 µm.

18. A process according to any one of claims 1 to 17, wherein the siliceous layer has a critical shear thinning stress higher than 10 Pa, preferably a shear thinning stress of from 12 to 20 Pa.

19. A process according to any one of claims 1 to 18, wherein the said carrier gas is air.

20. A bioreactor comprising a biomass immobilized by a siliceous layer as obtainable by the process described in any one of claims 1 to 19.

21. A bioreactor according to claim 20, wherein the bioreactor is an artificial organ or tissue, or is a cell aggregate which may also be genetically modified.

22. An implantable bioreactor according to claim 20 or claim 21, wherein the support is a matrix in form of microspheres.

23. Use of the bioreactor according to claim 22 for preparing an injectable pharmaceutical composition for performing a function of biological type.

24. An injectable pharmaceutical composition comprising an effective amount of the bioreactor according to claim 22 suspended in a physiological solution.

25. An injectable pharmaceutical composition according to

claim 24, wherein the microspheres have a diameter of from 0.05 to 1.0 mm.

26. An injectable pharmaceutical composition according to claims 24 and claim 26, wherein the amount of microspheres is of from 100 to 50,000 microspheres/ml of physiological solution.